National Institute of Environmental Health Sciences

Climate and health in Florida: Changes in risks of annual maximum temperatures in the second half of the twentieth century

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Abstract:

Spatial patterns of changes in the probability, or risks, of annual maximum temperatures over Florida during the second half of the 20th century are examined using a high resolution daily maximum temperature dataset of 833 grid cells. An Annual Maximum Series (AMS) coupled with Extreme Value Theory approach is applied to analyze changes in probabilities of annual maximum temperatures with a focus on the highest third tercile of all annual maximum temperatures during the time period. Three parameters are estimated from the data contained within each grid cell 1) location parameter which is closely related to mean and median, 2) scale parameter which is closely related to variance, and 3) shape parameter which is closely related to skew. The data are then divided into the periods 1949-1974 and 1975-2000 and changes in each of the parameters are mapped. Considerable spatial variability with respect to changes in parameters is found across the state. Much of the state exhibits a decline in both the value of the location and scale parameters with the exception of the southern portion and areas on the Gulf coast in the Panhandle and peninsular Florida. Almost all of the state shows an increase in skew. The Generalized Extreme Value distribution can be used to estimate the probabilities of experiencing particular temperatures or in computing a temperature associated with a certain risk or return period of interest. A simple non-parametric test of significance is carried out to detect changes in the number of annual maxima falling in the upper and lower terciles of events during the first and second halves of the record. (C) 2011 Elsevier Ltd. All rights reserved.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Temperature

Temperature: Extreme Heat, Fluctuations

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location:

resource focuses on specific location

United States

Health Co-Benefit/Co–Harm (Adaption/Mitigation):

specification of beneficial or harmful impacts to health resulting from efforts to reduce or cope with greenhouse gases

A focus of content

Health Impact:

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Time Scale Unspecified